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EXAMINER

CIRIC, LJILJANA V

ART UNIT	PAPER NUMBER
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3743

DATE MAILED: 08/21/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/660,733

Applicant(s)
Wilson et al.

Examiner
Ljiljana V. Ciric *AVC*

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Jan 8, 2002 and on Jun 10, 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 and 20-24 is/are pending in the application.
- 4a) Of the above, claim(s) 3, 11, and 12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4-10, 13-18, and 20-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 8 6) ☐ Other:

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DETAILED ACTION

Response to Amendment

1. This Office action is in response to the amendment and arguments filed on January 8, 2002 and on June 10, 2002.
2. Claims 1 through 18 and 20 through 24 remain in the application. The scope of each of claims 17, 18, 20, and 21 has been affected by the amendment filed on January 8, 2002. Claims 3, 11, and 12 remain withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected inventions or species, there being no allowable generic or linking claim.

Response to Arguments

3. Applicant's arguments filed on January 8, 2002 and on June 10, 2002 have been fully considered but they are generally not persuasive.

Applicant's arguments with regard to the previously made objection to the specification as failing to provide proper antecedent basis for the claimed subject matter rely on MPEP § 2173.05(e), which specifies that the mere fact that a term or phrase used in the claim has no antecedent basis in the specification disclosure does not mean, necessarily, that the term or phrase is indefinite as long as the terms and phrases used to define the invention do so with "a reasonable degree of clarity and precision". Since the examiner never rejected claim 13 as being indefinite due to the lack of proper antecedent basis in the specification for the term at issue, this section of the MPEP is irrelevant to the validity of the previously cited objection to the specification. Applicant

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is hereby once again referred to the applicable sections of the MPEP, namely 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Thus, since in accordance with the rules, guesswork must not be associated with determining the correspondence of terms in the claims to those in the specification, the earlier objection is repeated below.

The majority of applicant's arguments with respect to the previously cited rejection of the claims under 35 U.S.C. 112, second paragraph, have not been found persuasive and are repeated below. In general, if the scope of the invention sought to be patented cannot be determined from the language of the claims *with a reasonable degree of certainty*, a rejection of the claims under 35 U.S.C. 112, second paragraph is appropriate. See In re Wiggins, 488 F.2d 538, 179 USPQ 421 (CCPA 1973).

As a preface to the following traversal of applicant's arguments with regard to the previously cited prior art rejections of the claims, the examiner hereby notes that the claims in a pending application should be given their *broadest* reasonable interpretation. See In re Pearson, 181 USPQ 641 (CCPA 1974).

Applicant is also respectfully reminded that claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). Also, "[A]pparatus claims cover what a device *is*, not what a device *does*. (Emphasis in original). Hewlett-Packard Co. v. Bausch & Lomb Inc., 909 F.2d 1464, 1469 15 USPQ2d 1525, 1528 (Fed. Cir. 1990). Note that the limitations "in a manner selected to achieve a predetermined temperature profile along said passageway in material

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of said part adjacent to said fluid passageway, in response to fluid flow through said fluid passageway” as recited in claim 1 are generally functional in nature.

Furthermore, in response to applicant's arguments that the turbulence inducing structures of the Schubert, Staskus, Clyde, Smith, and VEB Inducal prior art references are “apparently configured to maximize heat transfer rates, and none of these references appear to teach turbulence inducing structure which has been intentionally configured to achieve heat transfer rates that produce a predetermined temperature profile within the material along the passageway”, it is hereby noted that applicant admits that all of these references disclose turbulence inducing structures which are configured to achieve a particular (i.e., a maximum) heat transfer rate. A particular temperature profile within the material along the passageway is inherently associated with each particular heat transfer rate and vice versa. Applicant also admits that the claims of the instant invention are intentionally broad as written and thus not limited to any one specific set of temperature profiles; it follows that the particular temperature profile associated with a maximized heat transfer rate along the passageway is not excluded from the scope of the claims as written. The references thus read on the claims as previously applied thereto.

Applicant's arguments with regard to the rejection of claims 10, 14, 16, and 21 under 35 U.S.C. 103(a) fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references. Applicant merely states in the arguments filed on January 8, 2002 (and restates in the arguments filed on June 10, 2002) that the

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applied references “not only fail to anticipate *a distinctive feature* of the invention which is expressly recited in each of independent Claims 1, 17, and 22, but that this feature would not be obvious in view of any of these references” without either clearly identifying the distinctive feature or explaining why this unidentified feature is not obvious in view of these references.

Drawings

4. Applicant’s arguments with regard to the previously made objections to the drawings have been found persuasive and the previously made drawings objections have been obviated thereby.

Specification

5. Applicant’s arguments with regard to the previously made objections to the abstract, while not necessarily persuasive, are hereby being withdrawn by the examiner in order to streamline prosecution of the application.

6. The specification is still objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required, for example: there is no antecedent basis in the specification clearly associated with the term “a fluid supply device” as cited in claim 13.

Claim Objections

7. Claims 17, 18, 20, and 21 are objected to because of the following informalities, for example: the comma (,) immediately following “apparatus” [claim 17, line 1] should be deleted.

Appropriate correction is required.

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Claim Rejections - 35 U.S.C. § 112

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 1, 2, 4 through 10, 13 through 18, and 20 through 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is not clear which *particular* structure or structures if any corresponds to the functional limitations “in a manner selected to achieve *a predetermined temperature profile* along said passageway *in material of said part adjacent to said fluid passageway, in response to fluid flow through said fluid passageway*” in claim 1 as written, thus rendering indefinite claim 1 and all claims depending therefrom. Additionally, the aforementioned limitations are not readily comprehensible as written due to idiomatic/grammatical informalities, rendering claim 1 and all claims depending therefrom even more indefinite with regard to the scope of protection sought. Which predetermined temperature profile? A particular temperature profile or a temperature profile determined in response to the expected fluid flow in the passageway or a temperature profile determined in response to the actual fluid flow in the fluid passageway or any predetermined temperature profile? Which material? Is the material or the part adjacent to the fluid passageway? Put another way, it is not clear which structure or structures are included and which ones are excluded by the aforementioned limitations. Claim 17 as amended contains the similarly unclear limitations “wherein locations of said structures are selected to achieve *a*

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predetermined temperature profile along said passageway in material of said plate adjacent to said fluid passageway, in response to fluid flow through said fluid passageway,” thus rendering indefinite claim 17 and all claims depending therefrom with regard to the scope of protection sought. Claim 22 contains the similarly unclear limitations “to achieve *a predetermined temperature profile along said passageway in material of said part adjacent to said fluid passageway, in response to fluid flow through said fluid passageway,*” thus rendering claim 22 and all claims depending therefrom indefinite with regard to the scope of protection sought.

With regard to claim 8, it is not clear what is meant by the limitation “said cold plate *includes* aluminum silicon carbide” in lines 1-2 of the claim. Is the term “includes” used synonymously with the more commonly used term “comprises” or not? If not, what exactly is the intended meaning? The limitation “said tubing *includes* stainless steel” appearing in claim 10 is similarly unclear, thus rendering the claims indefinite with regard to the scope of protection being sought. Is the limitation “said tubing includes stainless steel” used to mean that the tubing is made of stainless steel, that the tubing comprises stainless steel, that the tubing includes a part made of stainless steel, or that stainless steel in some form or shape is found in the tubing? If the term is used synonymously with “comprises”, recommend simply replacing “includes” with “comprises” in each of these claims.

There is insufficient antecedent basis in the claims for the following limitations: “said fluid” [claim 14, line 4]--note that the fluid was previously only functionally, and not positively, recited--recommend replacing “said fluid” with “the fluid”; “said temperature profile” [claim 16, line 2]--

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again, note that the temperature profile was previously only functionally, and not positively, recited--recommend replacing "said temperature profile" with "the temperature profile".

The limitations "further comprising a phased array antenna system which includes said part, said structure, and said electronic components" as cited in claim 15 is not clear as written and renders the claim indefinite. Which structure if any in addition to the part, the structure, and the electronic components does the phased array antenna system include? If no additional structure is included thereby, then are these previously cited elements (the part, the structure, and the electronic components) cited again in duplicate? Recommend replacing the limitations "further comprising a phased array antenna system which includes said part, said structure, and said electronic components" with "wherein said part, said structure, and said electronic components comprise a phased array antenna system" or similar, as appropriate.

The term "approximately" in claim 16 is a relative term which renders the claim indefinite. The term "approximately" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Thus, the limitation "approximately isothermal" as used to describe the temperature profile in claim 16 renders the temperature profile indeterminate.

The term "inward" in claim 20 is a relative term which renders the claim indefinite. The term "inward" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably

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apprised of the scope of the invention. Thus, as used to describe the annular protrusion, this term (which is not defined in terms of a reference parameter or parameters) renders the location of the protrusion indeterminate and thus renders claim 20 indefinite with respect to the scope of protection sought. In particular, it is not clear whether the term “inward” is used to mean “inward” with respect to the apparatus as a whole, “inward” with respect to the thermally conductive flat plate, “inward” with respect to the fluid passageway, or “inward” with respect to the each of the plurality of turbulence inducing structures.

The limitation “*along material of a thermally conductive part adjacent a fluid passageway formed within said part*” [claim 22, lines 2-3] is not clear as written, rendering indefinite claim 22 and claims 23 and 24 depending therefrom. What material? Is the thermally conductive part adjacent a fluid passageway formed within said part or is the material adjacent a fluid passageway formed within said part?

The limitation “which each induce turbulence” [claim 23, line 3] renders claim 23 indefinite because it is not clear to which previously recited element(s) the term “which” refers. Recommend replacing with a direct recitation of the element(s) referred to thereby. Each of claims 5, 6, and 24 also contains the same limitation, thus rendering indefinite these claims and any claims depending therefrom.

The above is an indicative, but not necessarily an exhaustive, list of 35 U.S.C. 112, second paragraph, problems. Applicant is therefore advised to carefully review all of the claims for

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additional problems. Correction is required of all of the 35 U.S.C. 112, second paragraph problems, whether or not these were particularly pointed out above.

Claim Rejections - 35 U.S.C. § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

11. As best can be understood in view of the indefiniteness of the claims, claims 1, 2, and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by *Schubert et al.* (filed on October 15, 1999; division of application filed on October 24, 1996).

Schubert et al. [especially Figures 8a and 10b] discloses the invention essentially as claimed, including foils or flat plates 1 and 2, and a plurality of turbulence inducing structures or pins 15 disposed along fluid passageways 1a and 1b, respectively. The foil material is inherently thermally conductive, at least to some degree.

The reference thus reads on the claims.

12. Alternately for claims 1, 2, and 17 and as best can be understood in view of the indefiniteness of the claims, claims 1, 2, 5 through 7, 17, 18, and 21 through 24 are rejected under 35 U.S.C. 102(b) as being anticipated by *Staskus et al.*

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Staskus et al. discloses the invention essentially as claimed, including a turbulence inducing structure including protrusions or baffles 34, a first plate or cold plate 14, and a plurality of electronic devices 50 coupled to the plate 14.

The reference thus reads on the claims.

13. Alternately for claims 1, 2, 17, 20, and 22, and as best can be understood in view of the indefiniteness of the claims, claims 1, 2, 4, 17, 20, and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by *Smith*.

Smith discloses the invention essentially as claimed, including a thermally conductive flat plate having a fluid passageway formed within the plate, the turbulence inducing structures each including an annular inward protrusion.

The reference thus reads on the claims.

14. Alternately for claims 1, 2, 4, 7, 17, 20, and 22, and as best can be understood in view of the indefiniteness of the claims, claims 1, 2, 4, 7, 9, 13, 17, 20, and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by *VEB Inducal*.

VEB Inducal [especially Figure 2] discloses the invention essentially as claimed, including a thermally conductive flat or cold plate 2b having a fluid passageway or channel 3 formed within the plate, and also including a turbulence inducing structure 2c and inwardly projecting annular protrusion 1a, tubing 1 at least partially imbedded within the cold plate 2b.

The reference thus reads on the claims.

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15. Alternately for claims 1, 2, 7, 17, and 22, and as best can be understood in view of the indefiniteness of the claims, claims 1, 2, 7, 8, 17, and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by *Clyde*.

Clyde [especially Figures 3, 4, and 6] discloses the invention essentially as claimed, including a thermally conductive part or plate or cold plate 84 or 86 or 214 having a fluid passageway formed in between high areas such as 96 and low areas such as 98, with the high areas such as 96 comprising protrusions extending from a surface of the fluid passageway. The cold plate or part is made of silicon carbide or a similar ceramic material.

The reference thus reads on the claims.

Claim Rejections - 35 U.S.C. § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. Alternately for claim 21 and as best can be understood in view of the indefiniteness of the claims, claims 10, 14, 16, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over *VEB Inducal*.

As noted in greater detail above, *VEB Inducal* discloses a cooling apparatus essentially as claimed, including that the inventive device is a fluid cooled heat sink for a semiconductor device and that tubing 1 is made from a metallic material.

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While *VEB Inducal* does not specifically disclose that tubing 1 includes stainless steel, for example, Official Notice is hereby taken by the examiner that stainless steel is used in heat exchanger tubing disposed in cooled heat sinks, for example. While *VEB Inducal* does disclose that the inventive device is to be used for cooling a semiconductor device and does furthermore suggest or imply that the semiconductor device to be cooled is to be thermally coupled with plate 2b, *VEB Inducal* does not specify that a plurality of electronic components are thermally coupled with the thermally conductive part or plate 2b. Nevertheless, it is not inventive to merely multiply or increase the number of electronic components which are thermally coupled with the plate 2b.

It would thus have been obvious to one skilled in the art at the time of the invention to modify the semiconductor cooling device of *VEB Inducal* by specifically having tubing 1 be made of either stainless steel or an alloy in order to simultaneously ensure high thermal conductance and durability of the tubing while keeping both manufacturing and maintenance costs relatively low. It would also have been obvious to one skilled in the art at the time of the invention to modify the semiconductor cooling device of *VEB Inducal* by merely increasing the number of electronic components which are thermally coupled to the cooling device in order to effectively and maximally utilize the cooling capability of the device, for example.

18. The non-application of art against claim 15 should not be construed as an indication that the claim contains allowable subject matter but rather that the claim could not be examined on the merits due to indefiniteness.

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Conclusion

19. The following additional prior art made of record and not relied upon is considered pertinent to applicant's disclosure. *Altoz, Staehlin et al., Geyh et al. (filed May 17, 1996)*, and *GEC-Marconi Limited*. each discloses an antenna array with cooling means.

20. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ljiljana (Lil) V. Ciric, whose telephone number is (703) 308-3925. While she works a flexible schedule that varies from day to day and from week to week, Examiner Ciric may generally be reached at the Office during the work week between the hours of 10 a.m. and 6 p.m. ET.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Henry Bennett, can be reached on (703) 308-0101. The fax phone number is (703) 305-3463.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0861.

lvc

August 20, 2002


LILJANA CIRIC
PATENT EXAMINER